# HMO Membership, Copayment, and Initiation of Care for Cancer: A Study of Working Adults

HOWARD P. GREENWALD, PHD

**Abstract:** This study compares diagnosis and commencement of treatment for cancer among persons with fully financed fee-for-service coverage, persons with copaid fee-for-service coverage, and persons in an HMO (health maintenance organization). A total of 242 subjects actively employed at the time of their diagnosis were interviewed, typically within six months of beginning cancer treatment. After sex, age, income, education, residence (urban vs rural), and disease site and stage had been controlled, those who made copayments were found to have waited an average of 1.25 months longer (95 per cent confidence limit (cl) ± .88) between initial suspicion of illness and obtaining a definitive diagnosis than those with full insurance coverage. Time from diagnosis until the beginning of treatment averaged .83 months longer (95 per cent cl ± .41) for HMO members than those in fee-for-service. These relations were strongest in income categories equal to or exceeding $20,000 per year. (*Am J Public Health* 1987; 77:461–466.)

## *Introduction*

Employers have recently begun to encourage employees to join health maintenance organizations (HMOs) or make copayments to help cover the cost of their health care. Supporters of HMOs argue that these organizations, free from the temptation in fee-for-service settings to provide more services than necessary, deliver care more economically.[1–4] Proponents of copayment plans, in which beneficiaries pay deductibles and percentages of their covered medical expenses, contend that such arrangements motivate more prudent consumption of health services.[5,6] Several observers, however,[7,8] suggest that HMOs emphasize cost consciousness at the expense of quality. Investigations in both the United States and Canada indicate that copayment reduces utilization of services,[9,10] while a broad range of research studies suggests that lack of disposable income and inadequate insurance coverage cause at least some individuals to forego necessary care.[11,12]

Focusing on conditions which pose threats to long-term survival, the Rand Health Insurance Experiment detected some evidence of negative health outcomes among individuals required to make copayments.[13] These outcomes were weakly related to copayment except among poor people at elevated risk, who also obtained less desirable health outcomes in an HMO than in fee-for-service.[14] Persons under care for cancer—a more serious, immediate medical problem than the conditions examined in the Rand study—may evidence clearer and more pervasive differences.

The research reported here examines the initiation of care for cancer as an indication of the quality of health services for an important disease entity. It compares employed persons receiving care from: 1) an HMO, 2) the fee-for-service system with copayments, and 3) the fee-for-service system without copayments. The term "initiation of care" includes both detection and treatment. Early detection and prompt treatment of cancer may both be regarded as "intermediate outcome" measures of the quality of care for the disease, presumably capable of affecting substantive health outcomes such as survival in important ways.

Address reprint requests to Howard P. Greenwald, PhD, Associate Professor and Director, Health Services Administration Program, School of Public Administration, University of Southern California, University Park, MC-0041, Los Angeles, CA 90089-0041. This paper, submitted to the Journal October 30, 1985, was revised and accepted for publication August 19, 1986.



## *Methods*

We studied the population in King and Pierce Counties, Washington, with newly diagnosed cancers of the lung, pancreas, prostate, and uterine cervix between 1980 and 1982. These malignancies were selected for study because they encompass a diversity of features reflecting the major distinctions among all cancers that occur frequently among adults. Patients were identified through the Cancer Surveillance System (CSS), a population-based tumor registry maintained by the Fred Hutchinson Cancer Research Center in Seattle. Operating under contract with the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program, the CSS attempts to register all cancer cases which occur in a 13-county area in northwest Washington State within three months of diagnosis. An evaluation of the CSS has recently demonstrated that fewer than 2.5 per cent of the cancer cases in its catchment area are missed by the registry.[15]

Data for the study were obtained primarily from face-to-face interviews, supplemented by clinical and demographic information from the CSS. In the face-to-face interviews, the research team gathered information on participation in the labor force, income, education, insurance coverage, and the initiation of care. CSS records provided data on cancer site, stage, date of diagnosis, gender, location of residence, and HMO membership.

A total of 877 living individuals with the characteristics specified above were identified. To safeguard privacy, the research team requested permission from each individual's physician before directly asking the patient for an interview. The researchers received permission to contact a total of 599 patients. Project staff succeeded in locating 591 of these, of whom 536 agreed to interviews and provided sufficient data to be included in the analysis. Those interviewed were either completing or had recently completed their first courses of treatment; approximately 60 per cent were interviewed within three months of their first treatment, over 90 per cent within six months. In their interviews, 242 reported that they had been actively employed just before contracting cancer. Consistent with the objectives of this study, only data on these individuals are reported below.

Those interviewed were more likely to have received surgical treatment and tended to survive longer than those not interviewed; no other differences between the two groups were observed. In response to inquiries about reasons for not granting permission to interview specific patients, physicians predominantly cited emotional problems, compromised men-

tal functioning, and advanced illness (including moribund status).

All individuals identified as HMO members belonged to the Group Health Cooperative of Puget Sound, the only HMO operating in northwest Washington State during the data collection period. About 15 per cent of both subjects interviewed in this study and the populations of King and Pierce Counties were Group Health Cooperative enrollees. Data published by the Puget Sound Health Systems Agency[16] and discussions with local health care providers indicate that only two other organizations, both independent practice associations (IPAs), offered services outside the fee-for-service setting to employed persons during the data collection period. The total enrollment of these organizations amounted to considerably less than 1 per cent of the labor force in King and Pierce Counties. Thus, the assumption that virtually all those not belonging to the Group Health Cooperative received fee-for-service care appears reasonable.

Three dimensions of the initiation of care served as dependent variables in the study: 1) stage (synonymous with "stage at detection"); 2) time elapsed between first suspicion of illness and diagnosis; and 3) time elapsed between diagnosis and treatment. The variables measuring time from first suspicion of illness to diagnosis, and time from diagnosis to treatment, were computed on the basis of both the CSS records and face-to-face interviews. Date of diagnosis was obtained from the CSS. Patients were asked in the face-to-face interviews the date when they first suspected they were ill, and when any and all treatments they underwent for the cure or palliation of cancer began and concluded. In instances where patients received more than one treatment, the treatment which began on the earliest date was used to compute time elapsed between diagnosis and treatment.

Insurance coverage was determined on the basis of an interview item asking the respondent whether he or she had paid any health care costs out of pocket in the past year other than insurance premiums. Another interview item asking the percentage of health care charges paid by third parties indicated that 95 per cent of the respondents had over 75 per cent of their charges covered. Because the distribution on the second item was so strongly skewed, it was not used in the data analysis.

CSS designation of patients as Group Health Cooperative enrollees was verified by checking physician names against the HMO's physician roster. An earlier investigation by the Fred Hutchinson Cancer Research Center using techniques highly similar to the study reported here compared dates of surgical treatment (the most frequent cancer therapy) reported in patient interviews and on physician and third-party billing records.[17] About 96 per cent of patients interviewed up to three months after surgery (as were the majority of subjects interviewed in the study reported here) indicated treatment dates within one week of the date recorded in the billing records. Similar information on reliability was unavailable for the date illness was first suspected. Cartwright, however, suggests that survey questions about specific illnesses and health events having major impacts on the individual produce relatively reliable responses even after several years.[18]

The investigators analyzed these data via multiple regression. Ordinary least-squares equations were estimated using the three dimensions of initiation of care specified above as dependent variables, and Group Health Cooperative membership and copayment as independent variables. Several disease and social background factors capable of affecting the dependent variables were included in the equations as controls.

*Results*

Table 1 presents means and proportions of values of the dependent, independent, social background, and disease-related variables in the sample obtained. Reflecting the distribution of cancer patients in the general population, lung and prostatic cancers predominate, with relatively few cases observed of pancreatic and cervical cancer. Among the HMO patients, very few observations of pancreatic and cervical cancers were obtained.

Tables 2 through 4 summarize multiple regression equations predicting stage, time from first suspicion of illness to diagnosis, and time from diagnosis to treatment. In the Tables, columns labeled "Equation A" present unstandardized regression coefficients and standard errors from equations including the HMO membership variable. Columns labeled "Equation B" present coefficients and standard errors from equations including the copayment variable.

All equations include sex, age, family income for the year before the cancer diagnosis, education in years, and urban residence as social background variables. Cancer site is also entered, as three dichotomous variables representing pancreatic, prostatic, and cervical cancers. The coefficient on each of these variables represents the difference between its value on the dependent variable and that of lung cancer, the remaining disease entity, which is not represented in the equations. In all equations, independent, social background, and disease-related variables were all entered simultaneously in a single step.

Neither HMO membership (see Equation A) nor copayment (see Equation B) are predictors of stage (Table 2).

As indicated by Equation A in Table 3, HMO membership is not a predictor of time from suspicion to diagnosis. Equation B, however, indicates a positive relation between copayment and time from suspicion to diagnosis. As indicated by Equation A in Table 4, HMO membership is positively related to time from diagnosis to treatment. No relation is observed between copayment and time from diagnosis to treatment in Equation B.

The equations presented in Tables 3 and 4 include stage on the right-hand side. Initially, stage was conceptualized as a dependent variable. Once it became apparent that neither HMO membership nor copayment predicted stage (see Table 2), the variable was included in subsequent equations because of its substantive importance as a disease factor.

A set of equations not presented here predicting the dependent variables in Tables 3 and 4 included *both* copayment and HMO membership on the right-hand side. In both equations, coefficients on these variables closely approximated those appearing in Tables 3 and 4. In addition, equations identical to Table 3 (Equation B) and Table 4 (Equation B) were run on a subsample including only fee-for-service patients. Coefficients estimated in these equations (both signs and magnitudes) were highly similar to those in Tables 3 and 4 (data available on request to author).

We also tested for interaction effects among the independent, social background, and disease-related variables by: 1) estimating equations on the basis of subsamples restricted to specific disease sites or demographic categories (e.g., age groups 59 and under or 60 and above); and 2) representing interactions between independent and background variables as dichotomous interaction terms in equations estimated for all 242 cases. Coefficients estimated in

**TABLE 1—Means and Proportions of Selected Characteristics of Sample by Type of Health Coverage**

| Characteristics | Health Coverage | | | |
|---|---|---|---|---|
| | HMO (N = 37) | Fee-for Service with Copayments (N = 132) | Fee-for Service without Copayments (N = 70) | All (N = 242)[a] |
| Cancer Stage (mean) | 1.71 | 1.81 | 1.98 | 1.85 |
| | (.137) | (.079) | (.098) | (.055) |
| Months from Suspicion to Diagnosis (mean) | 1.25 | 2.32 | 1.13 | 1.80 |
| | (.387) | (.363) | (.283) | (.226) |
| Months from Diagnosis to Treatment (mean) | 1.42 | 0.50 | 0.45 | 0.64 |
| | (.334) | (.069) | (.076) | (.072) |
| Sex (Per cent male) | 89.2 | 70.5 | 70.5 | 73.6 |
| | (5.17) | (3.99) | (5.51) | (2.84) |
| Age (mean years) | 59.7 | 56.9 | 57.3 | 57.5 |
| | (1.83) | (0.97) | (1.98) | (0.70) |
| Income (mean for family in preceding year, thousands of dollars) | 33.0 | 31.5 | 25.3 | 29.9 |
| | (2.35) | (1.37) | (1.52) | (1.03) |
| Education (mean years) | 13.7 | 13.3 | 12.3 | 13.1 |
| | (0.58) | (0.25) | (0.41) | (0.20) |
| Per cent Urban Residence[b] | 91.9 | 86.4 | 84.3 | 86.8 |
| | (4.55) | (2.30) | (4.38) | (2.18) |
| Cancer Site (per cent in sample with each disease) | | | | |
| Lung | 29.7 | 47.7 | 58.6 | 48.8 |
| | (7.06) | (4.36) | (5.94) | (3.22) |
| Pancreas | 2.7 | 2.3 | 4.3 | 2.9 |
| | (2.70) | (1.30) | (2.44) | (1.08) |
| Prostate | 59.5 | 36.4 | 22.9 | 35.5 |
| | (8.18) | (4.21) | (5.06) | (3.08) |
| Cervix | 8.1 | 13.6 | 14.2 | 12.8 |
| | (4.54) | (2.30) | (4.21) | (2.15) |

[a]Information on health coverage unavailable for three cases.
[b]Urban areas defined as census tracts within or contiguous to US Census-designated places of 5,000 or more residents.
NOTE: Standard Error in parentheses.

**TABLE 2—Regression Equations Predicting Stage at Diagnosis: Unstandardized Coefficients and Standard Errors**

| Independent Variables | Equation A | | Equation B | |
|---|---|---|---|---|
| | Coefficient | Standard Error | Coefficient | Standard Error |
| HMO Member (Yes = 1, No = 0) | −0.09 | (0.15) | — | — |
| Made Copayments (Yes = 1, No = 0) | — | — | −0.02 | (0.11) |
| Sex (M = 1, F = 2) | −0.09 | (0.17) | −0.08 | (0.17) |
| Age | 0.00 | (0.03) | 0.00 | (0.03) |
| Income | 0.03 | (0.02) | 0.03 | (0.02) |
| Education (years) | −0.04 | (0.02) | −0.04 | (0.02) |
| Urban Residence (Yes = 1, No = 0) | −0.19 | (0.16) | −0.20 | (0.16) |
| Cancer Site | | | | |
| Pancreas | 0.32 | (0.32) | 0.31 | (0.32) |
| Prostate | −0.40 | (0.13) | −0.41 | (0.13) |
| Cervix | −0.62 | (0.23) | −0.63 | (0.22) |
| Constant | 2.51 | | 2.66 | |
| $R^2$ | .14 | | .14 | |
| Adjusted $R^2$ | .11 | | .11 | |
| Mean on Dependent Variable (stage) | 1.85 | | | |

these procedures were generally consistent in sign and magnitude with their counterparts in Tables 2 through 4.

The effects of HMO membership and copayment, however, were not entirely consistent across income categories. The equations in Table 5 include variables representing both direct effects of income and interactions between: 1) income level and copayment, and 2) income level and HMO membership. Direct effects of income are represented by dichotomous variables based on two income categories ($20,000–$34,999 and $35,000 and over). Coefficients on these variables represent differences in time from suspicion to diagnosis or diagnosis to treatment between patients in these

**TABLE 3—Regression Equations Predicting Time from Suspicion of Illness to Diagnosis: Unstandardized Coefficients and Standard Errors**

| | Equation A | | Equation B | |
|---|---|---|---|---|
| Independent Variables | Coefficient | Standard Error | Coefficient | Standard Error |
| HMO Member (Yes = 1, No = 0) | −0.86 | (0.63) | — | — |
| Made Copayments (Yes = 1, No = 0) | — | — | 1.25 | (0.45) |
| Sex (M = 1, F = 2) | −0.20 | (0.73) | −0.28 | (0.72) |
| Age | −0.23 | (0.13) | −0.21 | (0.13) |
| Income | 0.20 | (0.08) | 0.17 | (0.08) |
| Education (years) | −0.12 | (0.08) | −0.14 | (0.07) |
| Urban Residence (Yes = 1, No = 0) | 0.21 | (0.68) | 0.17 | (0.67) |
| Cancer Site | | | | |
| Pancreas | 1.90 | (1.36) | 2.08 | (1.34) |
| Prostate | 0.90 | (0.57) | 0.77 | (0.56) |
| Cervix | 0.42 | (0.94) | 0.42 | (0.93) |
| Cancer Stage | −0.32 | (0.29) | −0.29 | (0.28) |
| Constant | 3.54 | | 7.27 | |
| $R^2$ | .10 | | .13 | |
| Adjusted $R^2$ | .05 | | .08 | |
| Mean on Dependent Variable (months) | 1.80 | | | |

**TABLE 4—Regression Equations Predicting Time from Diagnosis to Treatment: Unstandardized Coefficients and Standard Errors**

| | Equation A | | Equation B | |
|---|---|---|---|---|
| Independent Variables | Coefficient | Standard Error | Coefficient | Standard Error |
| HMO Member (Yes = 1, No = 0) | 0.83 | (0.21) | — | — |
| Made Copayments (Yes = 1, No = 0) | — | — | −0.16 | (0.16) |
| Sex (M = 1, F = 2) | −0.20 | (0.24) | −0.25 | (0.25) |
| Age | 0.04 | (0.04) | 0.04 | (0.04) |
| Income | 0.02 | (0.03) | 0.03 | (0.03) |
| Education (years) | 0.02 | (0.03) | 0.03 | (0.03) |
| Urban Residence (Yes = 1, No = 0) | −0.57 | (0.23) | −0.53 | (0.24) |
| Cancer Site | | | | |
| Pancreas | −0.45 | (0.46) | −0.43 | (0.48) |
| Prostate | 0.17 | (0.19) | 0.28 | (0.20) |
| Cervix | 0.50 | (0.32) | 0.56 | (0.33) |
| Cancer Stage | −0.03 | (0.10) | −0.05 | (0.10) |
| Constant | 1.95 | | 0.08 | |
| $R^2$ | .17 | | .10 | |
| Adjusted $R^2$ | .12 | | .05 | |
| Mean on Dependent Variable (months) | .64 | | | |

income categories and one omitted from the equations (under $20,000). Interactions between copayment (or HMO membership) and income category are represented by dichotomous variables, scored 1 for patients reporting copayment (or HMO membership) *and* falling into one of the income categories. Patients not meeting the required criteria for a given interaction term are scored zero. Coefficients on the interaction terms reflect differences between patients in specific income categories reporting copayment (or belonging to the HMO) and those not making copayments (or not belonging to the HMO), after the effect of belonging to the income category itself has been held constant. The strongest relation between copayment and time from suspicion to diagnosis occurs in the $20,000–$34,999 income category; the strongest relations between HMO membership and time from diagnosis to treatment occur in the income categories over $20,000.

In this study, out-of-pocket payment by HMO members appeared unimportant. Three of the HMO enrollees reported such payments. Interview notes indicate that these represented small expenses for chiropractic services and drugs not covered by the plan. Mean times between treatment and interviews were approximately equal for HMO members, fee-for-service patients with copayment, and fee-for-service patients without copayment.

*Discussion*

The findings suggest that both copayment and HMO membership predict delay in the initiation of care for cancer in the population studied. After social background and

**TABLE 5—Regression Equations Predicting Time from Suspicion of Illness to Diagnosis, and Time from Diagnosis to Treatment, Including Interaction Terms: Unstandardized Coefficients and Standard Errors**

| | Dependent Variables | | | |
|---|---|---|---|---|
| | Time from Suspicion to Diagnosis | | Time from Diagnosis to Treatment | |
| Independent Variables | Coefficient | Standard Error | Coefficient | Standard Error |
| HMO Member | | | | |
| Income under $20,000 | — | — | 0.04 | (0.50) |
| Income $20,000–$34,999 | — | — | 0.76 | (0.32) |
| Income $35,000 and over | — | — | 1.19 | (0.35) |
| Made Copayments | | | | |
| Income under $20,000 | 0.94 | (0.81) | — | — |
| Income $20,000–$34,999 | 1.87 | (0.71) | — | — |
| Income $35,000 and over | 0.95 | (0.84) | — | — |
| Income $20,000–$34,999 | 0.29 | (0.78) | −0.03 | (0.20) |
| Income $35,000 and over | 1.13 | (0.95) | 0.01 | (0.23) |
| Sex (M = 1, F = 2) | −0.38 | (0.72) | −0.23 | (0.24) |
| Age | −0.20 | (0.13) | 0.05 | (0.04) |
| Education (years) | −0.13 | (0.08) | 0.02 | (0.03) |
| Urban Residence (Yes = 1, No = 2) | 0.13 | (0.67) | −0.56 | (0.23) |
| Cancer Site | | | | |
| Pancreas | 2.12 | (1.37) | −0.39 | (0.46) |
| Prostate | 0.86 | (0.57) | 0.20 | (0.20) |
| Cervix | 0.46 | (0.94) | 0.54 | (0.32) |
| Cancer Stage | −0.28 | (0.29) | −0.03 | (0.10) |
| Constant | 5.28 | | 0.35 | |
| $R^2$ | .13 | | .18 | |
| Adjusted $R^2$ | .06 | | .12 | |
| Mean on Dependent Variable (months) | 1.80 | | .64 | |

disease-related variables had explained all they could, those who made copayments waited an average of 1.25 months longer between first suspicion of illness and diagnosis than those who did not (95 per cent cl ± .88). On the average, HMO enrollees waited .83 months longer between diagnosis and treatment than fee-for-service patients (95 per cent cl ± .41).

Several cautionary notes must be made here. First, these findings may not be generalizable to cancer patients relatively near death. While HMO physicians appeared to withhold permission to interview their patients as often (and for the same reasons) as fee-for-service physicians, inclusion of all patients in the pertinent population might have yielded different results. Second, the models developed in this article explain only small proportions of the dependent variables. Third, the differences detected in the disease and social background characteristics of the HMO, fee-for-service patients without copayment, and fee-for-service patients with copayment (see Table 1) suggest that other differences not measured in the study might exist as well. If represented in the regression equations presented above, such differences might explain away the reported findings.

Furthermore, delays detected here may not affect substantively important outcomes such as survival. The representation of cervical cancer (a disease highly responsive to early treatment) is sparse in this sample, particularly in the HMO segment. Benefits obtainable from an HMO may compensate for the increased time lag from detection to treatment. Readers must recall that the HMO studied here is among the best established and regarded organizations of its kind in the United States. Newer HMOs attempting to establish themselves in an increasingly competitive environment may evidence longer delays and less favorable tradeoffs.

Copayment and HMO membership appear to affect the initiation of care in different ways. Copayment may encourage patients themselves to delay care, as the need to expend personal resources reinforces the natural fear associated with the suspicion of cancer.[19] Thus, individuals reporting copayment indicate longer periods of time between suspicion and diagnosis. Perhaps due to the absence of a fee barrier, HMO membership does not predict this form of delay. On the other hand, organizational features of the HMO itself such as queueing of patients, scheduling routines, and incentives for conservative use of resources may account for the relation between HMO membership and time elapsed between diagnosis and treatment.

The above findings must be viewed in the light of recommendations for allocating a greater degree of "financial responsibility to employees in the form of increased coinsurance and deductibles,"[20] and encouragement by employers of HMO enrollment. The observations reported here suggest the need for caution and continued outcome evaluation of changes in the organization and financing of health care. This may be as true for plans covering employed, middle-income people as for programs serving the retired or poor.

***ACKNOWLEDGMENTS***

Christopher Bellavita, Edgar F. Borgatta, Susan J. Dirks, Surseh Malhotra, Ruth McCorkle, Michael C. Nevitt, Philip Reeves, Edward H. Wagner, and Edward H. Yelin deserve special thanks for reading and commenting on earlier drafts of this article. Collection of data reported here was supported in part by the National Cancer Institute under Grant No. 5 R18 CA 32564-02. Parts of the data analysis took place under funding from the American Cancer Society, Grant No. PBR-11. Conclusions are solely those of the author.

## REFERENCES

1. Gaus CR, Cooper BS, Hirshman CG: Contrasts in HMO and fee-for-service performance. Soc Secur Bull 1976; 39:3–14.
2. Luft HS: Assessing the evidence on HMO performance. Milbank Mem Fund Q 1980; 58:501–536.
3. Luft HS: Health Maintenance Organizations: Dimensions of Performance. New York: John Wiley, 1981.
4. Luft HS: How do health maintenance organizations achieve their "savings"?: rhetoric and evidence. N Engl J Med 1978; 298:1336–1343.
5. Kaplan RS, Lave LB: Patient incentives and hospital insurance. Health Serv Res 1971; 6:288–300.
6. Ginsberg, PB, Manheim LM: Insurance, copayments, and health services utilization. J Econ Bus 1973: 25:142–153.
7. Brown LD: Politics and Health Care Organization: HMOs as Federal Policy. Washington, DC: Brookings Institution, 1983.
8. Freidson E: Doctoring Together. Chicago: University of Chicago Press, 1975.
9. Scitovsky AA, Snyder NM: Effects of co-insurance on use of physician services: a reconsideration. Soc Secur Bull 1972: 35:3–19.
10. Beck RG, Horne JM: Utilization of publicly insured health services in Saskatchewan before, during, and after copayment. Med Care 1980; 19:787–806.
11. Aday LA, Andersen R, Fleming GV: Health Care in the United States: Equitable for Whom? Beverly Hills: Sage Publications, 1981.
12. Kleinman JC: NHIS Results by Income and Insurance. Hyattsville, MD: USDHHS, 1980.
13. Brook RH, Ware JE, Rogers WH, *et al:* Does free care improve adults' health? results from a randomized controlled trial. N Engl J Med 1983; 309:1426–1434.
14. Ware JE, Rogers WH, Davies AR, *et al:* Comparison of health outcomes at a health maintenance organization with those of fee-for-service care. Lancet 1986; 1:1017–1022.
15. Smith, EM, Francis AM, Polissar L: The effect of breast self-exam practices and physician examinations on extent of disease at diagnosis. Prev Med 1980; 9:409–417.
16. Puget Sound Health Systems Agency: Managed Health Care Plans: A Directory of HMOs and PPOs Offering Health Plans in Washington State. Seattle: Puget Sound Health Systems Agency, 1985.
17. Polissar L, Styron L, Francis A: Reliability of patient recall of events in a cancer episode. *In:* Proceedings of the Social Statistics Section, 1976, Part II. Washington, DC: American Statistical Association, 1976.
18. Cartwright A: Memory errors in a mortality survey. Milbank Mem Fund Q 1963; 41:5–24.
19. Greenwald HP, Becker SW, Nevitt MC: Delay and noncompliance in cancer detection: a behavioral perspective for health planners. Milbank Mem Fund Q 1978; 56:212–230.
20. Enthoven AC: The Rand experiment and economical health care. N Engl J Med 1984; 310:1528–1530.


## APHA Food and Nutrition Section Announces 1987 Awards Program

The Food and Nutrition Section of the American Public Health Association is inviting applications for its 1987 financial awards for graduate education in public health nutrition and also seeking nominations for its 1987 award for professional excellence in the field.

*Graduate Education Awards*—Three awards of $2,000 each will be given to aid outstanding individuals to pursue graduate education in public health nutrition during the 1987–88 academic year. Applicants for these awards must demonstrate potential in the field by evidence of successful work/volunteer experience, academic achievements, and supporting letters of recommendation. Applicants must be accepted as a fulltime student for a master's degree in public health nutrition at a graduate school recognized by the Graduate Faculties in Public Health Nutrition (list of accepted schools available from the contact person named below). Two "Helen R. Stacey Awards for Graduate Education in Public Health Nutrition", and one "Joseph A. Walsh Award for Maternal and Child Nutrition" will be chosen by an Awards Committee of the Food and Nutrition Section. The awards, sponsored by Mead Johnson Nutritional Division, are presented annually at the APHA meeting, which this year will be held October 18–22 in New Orleans.

*Mary C. Egan Award*—The "Mary C. Egan Award" recognizes the professional excellence contributions, and outstanding service of public health nutritionists, as well as their continuing participation in the Food and Nutrition Section of APHA. The award, sponsored by Ross Laboratories, includes a $500 honorarium, and will be presented during the APHA 115th annual meeting in New Orleans. Nominations should include a current curriculum vitae of the nominee, along with statements and letters in support of the nomination.

The *deadline* for these awards is *May 1, 1987.* For further information, contact: Lois B. Earl, RD, MS, Chairperson, Awards Committee, Food and Nutrition Section, 1300 Warrington Place, Alexandria, VA 22307. Tel: 703/768–0026 or 202/724–5622.